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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,937	11/26/2003	Trausti T. Kristjansson	M61.12-0577	9636

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EXAMINER	
VO, HUYEN X	

ART UNIT	PAPER NUMBER
2626	

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12/31/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/722,937	KRISTJANSSON ET AL.	
	Examiner	Art Unit	
	HUYEN X. VO	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6 and 9-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6 and 9-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's arguments have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Pearson (USPN 6195632).

Claim Objections

2. Claims 12-19 are objected to because of the following informalities: the term "computer-readable storage medium" is not found the original specification. Applicant is advised to amend "computer-readable storage medium" in the claims to just – computer storage medium – or to amend the specification to include – computer-readable storage medium – to make the claims consistent with the disclosure. Appropriate correction is required.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the term "computer-readable storage medium" is not found the original specification. Applicant is advised to amend "computer-readable storage medium" in the claims to just – computer storage medium – or to amend the specification to include – computer-readable storage medium – to make the claims consistent with the disclosure.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1, 3-6, and 9-11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

6. Claims 1, 3-6, and 9-11 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101" – publicly available at USPTO.GOV, "memorandum to examining corps"). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example, the steps of "identifying", "filtering", "determining", "using the parameters", and "using the log-magnitude" are not tied to a particular apparatus or system.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 3-5, 9-11, 12-16, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey et al. (Publication entitled "ALGONQUIN: Iterating Laplace's Method to Remove Multiple Types of Acoustic Distortion for Robust Speech Recognition", submitted by applicant) in view of Pearson (USPN 6195632).

9. Regarding claim 1, Frey et al. disclose a method of identifying a clean speech signal from a noisy speech signal, the method comprising:

identifying a set of log-magnitude frequency values for each of a plurality of frames that represent the noisy speech signal (*2nd page, left column; noisy speech signal in converted into log-magnitude frequency values; equations 5-6*);

determining parameters of at least one posterior probability distribution of at least one component of a clean signal value based on the set of filtered noisy values without applying a frequency-based transform to the set of filtered noisy values, the posterior probability distribution providing the probability of a log-magnitude frequency value for a clean speech signal given a filtered noisy value (*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; "computing posterior responsibilities of the component indexed by s"; and deriving the minimum squared error estimate of the clean speech*);

using the parameters of the posterior probability distribution to estimate a set of log-magnitude frequency values for a clean speech signal (*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; plug equation 13 into equation 14 and equation 14 into equation 8 to obtain clean speech signal*); and

using the log-magnitude values for the clean speech signal to produce an output clean speech signal (*see equation 8*).

Frey et al. fail to specifically disclose the step of filtering the log-magnitude frequency values of the noisy speech signal to smooth the log-magnitude frequency values over time to form filtered noisy values by applying the log magnitude frequency values of the noisy speech signal to a FIR filter having a set of filter parameters, wherein at least one of the filter parameters of the set of filter parameters differs from another of the filter parameters of the set of filter parameters. However, Pearson further discloses the step of filtering the log-magnitude frequency values of the noisy speech signal to smooth the log-magnitude frequency values over time to form filtered noisy values by applying the log magnitude frequency values of the noisy speech signal to a FIR filter having a set of filter parameters (*col. 6, lines 30-39*), wherein at least one of the filter parameters of the set of filter parameters differs from another of the filter parameters of the set of filter parameters (*col. 6, lines 30-39; inherently included in the FIR filter; e.g. filter coefficient parameter is obviously different from the filter gain parameters*).

Since Frey et al. and Pearson are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the

time of invention to modify Frey et al. by incorporating the teaching of Pearson in order to eliminate some problems with local minima, by eliminating the effects of harmonics or sharp zeros (*col. 6, lines 30-39*).

10. Regarding claim 12, Frey et al. disclose a computer-readable medium having computer-executable instructions for performing steps comprising:

determining a posterior probability based on the filtered values, wherein a frequency-based transform is not applied before the filtered values are used to determine the posterior probability and wherein the posterior probability provides the probability of the frequency values for a clean speech signal given the filtered values (*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; "computing posterior responsibilities of the component indexed by s"; and deriving the minimum squared error estimate of the clean speech; the IFFT is applied on frequency values of a clean speech to bring the clean speech signal to the time domain for output*); and

using the posterior probability to estimate a frame of a clean speech signal (*2nd page, left column, equation 8 and 3rd page left column, equations 13-14; plug equation 13 into equation 14 and equation 14 into equation 8 to obtain clean speech signal*); and

using the frame of the clean speech signal to produce an output clean speech signal (*see equation 8*).

Frey et al. fail to specifically disclose the step of filtering the log-magnitude frequency values of the noisy speech signal to smooth the log-magnitude frequency values over time to form filtered noisy values by applying the log magnitude frequency

values of the noisy speech signal to a FIR filter having a set of filter parameters, wherein at least one of the filter parameters of the set of filter parameters differs from another of the filter parameters of the set of filter parameters. However, Pearson further discloses the step of filtering the log-magnitude frequency values of the noisy speech signal to smooth the log-magnitude frequency values over time to form filtered noisy values by applying the log magnitude frequency values of the noisy speech signal to a FIR filter having a set of filter parameters (*col. 6, lines 30-39*), wherein at least one of the filter parameters of the set of filter parameters differs from another of the filter parameters of the set of filter parameters (*col. 6, lines 30-39; inherently included in the FIR filter; e.g. filter coefficient parameter is obviously different from the filter gain parameters*).

Since Frey et al. and Pearson are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Frey et al. by incorporating the teaching of Pearson in order to eliminate some problems with local minima, by eliminating the effects of harmonics or sharp zeros (*col. 6, lines 30-39*).

11. Regarding claim 13, Frey et al. further disclose wherein estimating a frame of clean speech signal comprises estimating log-magnitude frequency values for the frame of clean speech signal (*2nd page, left column*).

12. Regarding claims 3 and 14, Frey et al. further disclose taking the exponent of each of the log-magnitude values in the set of log-magnitude values to produce a set of magnitude values for the clean speech signal (*equation 5*).

13. Regarding claims 4 and 15-16, Frey et al. further inherently disclose transforming the set of magnitude values for the clean speech signal into a set of time domain values representing a frame of the clean speech signal (*transforming the clean signal into a time domain for playback is inherent in the system*), and transforming the magnitude values comprises performing an inverse Fast Fourier Transform (*transforming the clean signal into a time domain for playback is inherent in the system*).

14. Regarding claim 5, Frey et al. further disclose transforming a frame of the noisy speech signal into the frequency domain to form the frequency values for the noisy speech signal (*2nd page, left column, equations 2-4*).

15. Regarding claim 9, Frey et al. further inherently disclose the method of claim 5 wherein transforming a frame of the noisy speech signal into the frequency domain comprises producing a set of more than one hundred frequency magnitude values (*2nd page, left column; multiple frames includes multiple data points will yields multiple frequency magnitude values; and the number is big in signal process*).

16. Regarding claims 10-11 and 18-19, Frey et al. further disclose wherein determining the parameters of at least one posterior probability distribution comprises utilizing an iterative process to determine the parameters (*equations 13-14, iterative process*), and wherein determining parameters of at least one posterior distribution comprises determining parameters for each of a set of mixture components (*referring to section 3*).

17. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey et al. (Publication entitled "ALGONQUIN: Iterating Laplace's Method to Remove Multiple Types of Acoustic Distortion for Robust Speech Recognition", submitted by applicant) in view of Pearson (USPN 6195632), and further in view of Ephraim (IEEE Publication, from IDS).

18. Regarding claim 6, Frey et al. fail to specifically disclose the method of claim 5 wherein transforming a frame of the noisy speech signal into the frequency domain further comprises generating a set of frequency phase values and wherein transforming the set of magnitude values for the clean speech signal into a set of time domain values further comprises using the set of frequency phase values to transform the set of magnitude values (*left column, second paragraph on page 730 and equation 33 on page 732*). However, Ephraim teaches generating a set of frequency phase values and wherein transforming the set of magnitude values for the clean speech signal into a set of time domain values further comprises using the set of frequency phase values to

transform the set of magnitude values (*left column, second paragraph on page 730 and equation 33 on page 732*).

Since Frey et al. and Ephraim are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Frey et al. by incorporating the teaching of Ephraim in order to preserve the original phase so that clean speech signal with the original phase can be reconstructed.

19. Regarding claim 17, Frey et al. fail to specifically disclose wherein performing an inverse Fast Fourier Transform further comprises using phase values generated by converting the frame of the noisy speech signal from the time domain to the frequency domain. However, Ephraim teaches performing an inverse Fast Fourier Transform further comprises using phase values generated by converting the frame of the noisy speech signal from the time domain to the frequency domain (*left column, second paragraph on page 730 and equation 33 on page 732*).

Since Frey et al. and Ephraim are analogous art because they are from the same field of endeavor, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Frey et al. by incorporating the teaching of Ephraim in order to preserve the original phase so that clean speech signal with the original phase can be reconstructed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUYEN X. VO whose telephone number is (571)272-7631. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Huyen X Vo/ 12/30/2008
Primary Examiner, Art Unit 2626

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